REMARKS

Claims 10, 11, 16 and 18 are pending in this application. Claims 10, 11, 16 and 18 are independent claims. By this amendment, claims 11 and 16 are amended to correct minor informalities contained therein. Reconsideration in view of the above amendments and following remarks is respectfully solicited.

I. THE OBJECTIONS TO THE CLAIMS ARE OBVIATED

The Office Action objects to claims 11 and 16 for minor informalities contained therein. This objection is respectfully traversed.

Applicant respectfully submits that the amendment to claims 11 and 16 obviates the objections of the claims. Accordingly, withdrawal of the objection of claim 11 and 16 is respectfully solicited.

II. THE CLAIMS DEFINE PATENTABLE SUBJECT MATTER

The Office Action rejects: (1) claims 10, 11, 16 and 18 under 35 U.S.C. §103(a) as being unpatentable over U.S. Patent No. 5,273,423 to Shiraiwa (hereafter Shiraiwa), U.S. Patent No. 5,277,215 to Yanagawa et al. (hereafter Yanagawa), and U.S. Patent No. 5,223,001 to Saeki (hereafter Saeki); and (2) claims 16 and 18 under 35 U.S.C. §103(a) as being unpatentable over Shiraiwa, Yanagawa, and U.S. Patent No. 5,324,540 to Terada (hereafter Terada). These rejections are respectfully traversed.

Applicant respectfully submits that the combination of Shiraiwa, Yanagawa and Saeki and/or the combination of Shiraiwa, Yanagawa and Terada fail to teach or suggest each and every feature as set forth in the claimed invention.

To establish a *prima facie* case of Obviousness, three basic

criteria must be met. First, there must be some suggestion or motivation, either in the references themselves or in the knowledge generally available to one of ordinary skill in the art, to modify the reference or to combine reference teachings. Second, there must be a reasonable expectation of success. Finally, the prior art reference (or references when combined) must teach or suggest all the claim limitations. The teaching or suggestion to make the claimed combination and the reasonable expectation of success must both be found in the prior art and not based on applicant's disclosure. *In re Vaeck*, 947 F.2d 488, 20 USPQ2d 1438 (Fed. Cir. 1991). See MPEP 706.02(j).

With regards to Shiraiwa, the present Office Action only asserts that Shiraiwa teaches a substrate processing apparatus as previously stated. However, the Office Action has failed to address applicant's previous arguments regarding Shiraiwa. For instance, as previously noted, applicant respectfully submits that element #32 in Fig. 2 of Shiraiwa is not a local exhaust for locally exhausting a dust generating portion of the moving mechanism as asserted by the Examiner in the Office Action dated February 22, 2001. Instead, element #32 is a chamber exhaust for exhausting the load lock chamber. The Examiner has previously described element #32 of Shiraiwa as both the local exhaust and the chamber exhaust. However, Shiraiwa only discloses the exhaust tube 32 as for exhausting the load lock chamber 8. Shiraiwa fails to disclose or suggest local exhaust for locally exhausting a dust generating portion of a moving mechanism.

In contrast to Shiraiwa, the present invention includes a local exhaust for locally exhausting a dust generating portion of a moving mechanism disposed in a load lock chamber, in addition to a chamber exhaust for exhausting the load lock chamber, as set forth

in claims 10, 11, 16 and 18. Based on previous statement made by the Examiner, it appears that the Examiner is mistakenly associating 121, 120 and 122 in Fig. 2 of the present application with both local and chamber exhaust. However, none of 121, 120 and 122 includes a local exhaust. In the present embodiment, the local exhausts are 20, 21 and 22.

Furthermore, Shiraiwa discloses that the element 32b is not the local exhaust for locally exhausting the dust generating portion of the moving mechanism provided in the load lock chamber. The element 32b in Shiraiwa is used only when the cassette chamber 61 is exhausted. (see Shiraiwa, col. 5, lines 49-66). The valve of the gas exhaust tube 32b is open only when the vacuum is created inside the cassette chamber 61. After that, the valve of the gas exhaust tube 32b is closed and the N_2 gas is introduced into the cassette chamber 61. Then the gate between the cassette chamber 61 and the transfer chamber 60, and between the load lock chamber 8 and the transfer chamber 60 are opened to transfer the wafer cassette 63 to the wafer boat 18 in the load lock chamber 8. That is, the gas exhaust tube 32b is never used to locally exhaust the dust generating portion of the moving mechanism provided in the load lock chamber 8.

The Office Action has relied on Shiraiwa to teach the local exhaust feature and the other cited references fail to make up for the deficiencies found in Shiraiwa. As such, applicant respectfully submits that at least for this reason, Shiraiwa and the other cited references fail to make claims 10, 11, 16 and 18 obvious.

Concerning claims 16 and 18, the Office Action again asserts that Shiraiwa teaches a substrate processing chamber as previously stated and the Office Action ignores applicant's previous arguments

concerning Shiraiwa. The apparatus according to claim 16 of the present application comprises a second vacuum exhaust line which is connected with the substrate processing chamber and the first vacuum exhaust line. A third vacuum exhaust line is connected with the load lock chamber, and the first vacuum exhaust line is to be connected to a vacuum pump. The first vacuum exhaust line is connected with the load lock chamber and a second vacuum exhaust line is connected with the substrate processing chamber and the first vacuum exhaust line. Shiraiwa fails to teach or suggest this structure. With the claimed structure, manufacturing cost can be lowered and the entire system can be simplified. (see applicant's specification, page 12, line 27 to page 13, line 5).

Furthermore, the apparatus according to claim 16 further comprises a second valve provided at a portion of the first vacuum exhaust line between the load lock chamber and a connection portion of the first and second vacuum exhaust line. A valve controller controls the first and second valves. The valve controller controls the second valve to be closed during processing of the substrate in the substrate processing chamber.

For example, in a reaction oven 19, a film formation processing of the wafer 101 is carried out. As conditions of such a film formation, it is important to strictly control the temperature and pressure within the reaction oven 19. (see applicant's specification, page 19, line 6 to page 20, line 6).

In the present embodiment, N_2 ballast method is employed as a method for pressure control. The N_2 ballast method is a method in which the gas-exhausting is conducted while keeping an exhaust capability of the vacuum pump 80 constant, allowing N_2 gas to enter from the N_2 ballast piping 131 which is connected to an intermediate portion of the vacuum exhaust line 122. The flow rate of the N_2 gas

is controlled by the flow meter 132, thereby adjusting the exhaust amount from the reaction oven 19 to adjust the pressure in the reaction oven 19.

In this manner, the pressure within the reaction oven 19 is strictly adjusted by adjusting the exhausting capability from the reaction oven 19 by the vacuum exhaust line 122. Therefore, during formation of film within the reaction oven 19, if the exhaust gas from the local exhaust line 23 is left flowing into the vacuum exhaust line, a variation in the flow rate of the local exhaust line 23 and the like affects the vacuum exhaust line 122 to vary the exhaust conductance of the vacuum exhaust line 122. As a result, pressure within the reaction oven 19 is varied. Therefore, the local gas-exhausting is not conducted during the film formation processing in the reaction oven 19.

On the other hand, if the local gas-exhausting is stopped as described above, because the wafers 101 and the boat 10 exist within the reaction oven 19, such wafers 101 and the boat 10 are not contaminated.

The Examiner asserts that element 61 of Shiraiwa is a processing chamber. However, 61 is not a processing chamber, 61 is a cassette chamber. Furthermore, in the present invention, it is not a processing chamber to which the local exhaust is connected, it is a space covered by a cover for covering a dust generating portion of the moving mechanism to which the local exhaust is connected.

In claim 16, the second exhaust line is connected to the first exhaust line which is to be connected to the vacuum pump, which connection necessarily means that the first and second exhaust lines are necessarily connected to a single vacuum pump.

As for claim 18, Shiraiwa's Fig. 11 element #18 top covering

of the wafer boat or #26 flange is not a cover for covering a dust generating portion of the moving mechanism. Further, Shiraiwa fails to disclose the claimed partition, and also fails to disclose the claimed gas flow through the slit in the partition.

As for the newly cited Terada, the boat supporting and rotating system 20 is provided out of the inner cylinder 6 and not in the inner cylinder 6. That is, a dust generating portion is not in the inner cylinder 6, which forms a processing region 8 for processing wafers. Further, as apparent from Fig. 3 of Shiraiwa, and its explanation, the exhaustion of the boat supporting and rotating system 20 and the exhaustion of the inner cylinder 6 are not performed simultaneously. That is, when the process tube is exhausted, the valve V5 is closed, and therefore, Terada also fails to disclose the main structure of the apparatus according to claim 18.

Applicant respectfully submits that the combination of cited references fail to teach or suggest each and every feature as set forth in the claimed invention, for at least the reasons noted above.

Applicant respectfully submits that independent claims 10, 11, 16 and 18 are allowable over the cited references for at least the reasons noted above.

Accordingly, withdrawal of the rejection of claims 10, 11, 16 and 18 under 35 U.S.C. §103(a) is respectfully solicited.

III. CONCLUSION

In view of the foregoing, Applicant respectfully submits that the application is in condition for allowance. Favorable reconsideration and prompt allowance are earnestly solicited.

Docket No.: 2342-0107P
App. No.: 08/813,200

Applicant respectfully petitions under the provisions of 37 C.F.R. §1.136(a) and §1.17 for a three (3) months extension of time in which to respond to the Examiner's Office Action. The appropriate Extension of Time Fee is attached hereto.

Should the Examiner believe that anything further would be desirable to place this application in better condition for allowance, the Examiner is invited to contact Carolyn T. Baumgardner (Reg. No. 41,345) at (703) 205-8000 **to schedule a Personal Interview**.

If necessary, the Commissioner is hereby authorized in this, concurrent, and future replies, to charge payment from or credit any overpayment to Deposit Account No. 02-2448 for any additional fees required under 37 C.F.R. §1.16 or under 37 C.F.R. §1.17; particularly, the extension of time fees.

Respectfully submitted,

BIRCH, STEWART, KOLASH & BIRCH, LLP

By _____
Michael K. Mutter, #29,680

P.O. Box 747
Falls Church, VA 22040-0747
(703) 205-8000

MKM/CTB/mpe
2342-0107P

Attachment: Version with Markings to Show Changes Made

VERSION WITH MARKINGS SHOWING CHANGES MADE

IN THE CLAIMS:

The claims are amended as follows:

11. (Six Times Amended) A substrate processing apparatus comprising:

a substrate processing chamber for processing a substrate;

a load lock chamber;

a gas supply for supplying gas into said load lock chamber;

a chamber exhaust for exhausting said load lock chamber, said chamber exhaust including an atmospheric pressure vent line and a vacuum exhaust line, said vacuum exhaust line connected to said load lock chamber and to be connected to a vacuum pump, one end of said atmospheric pressure vent line being an open end and [the] an other end of said atmospheric pressure vent line being connected vacuum exhaust line,

a moving mechanism provided in said load lock chamber for moving said substrate;

a local exhaust for locally exhausting a dust generating portion of said moving mechanism;

a flow rate regulator in one of said gas supply, said chamber exhaust and said local exhaust;

a first valve disposed at an intermediate portion of said vacuum exhaust line;

a second valve disposed at an intermediate portion of said atmospheric pressure vent line;

a pressure detector for detecting pressure in said load

lock chamber; and

a controller for controlling said first and second valves such that during movement of said substrate by said moving mechanism, said first valve is closed and said second valve is opened, and for controlling said flow rate regulator in accordance with a signal from said pressure detector to keep [the] a inside of said load lock chamber at a higher pressure level than [the] an atmospheric pressure during movement of said substrate by said moving mechanism.

16. (Five Times Amended) A substrate processing apparatus comprising:

a substrate processing chamber for processing a substrate;

a load lock chamber;

a gas supply for supplying gas into said load lock chamber;

a chamber exhaust connected with said load lock chamber for exhausting said load lock chamber;

a moving mechanism provided within said load lock chamber for moving said substrate;

a first vacuum exhaust line which is to be connected to a vacuum pump and which is connected with said load lock chamber;

a second vacuum exhaust line which is connected with said substrate processing chamber and said first vacuum exhaust line;

a local exhaust for locally exhausting a dust generating portion of said moving mechanism, one end of said local exhaust being connected with said first vacuum exhaust line and [the] an other end of said local exhaust being connected to a space covered by a cover for covering a dust generating portion of the moving mechanism;

a first valve connected to an intermediate portion of said local exhaust;

a second valve provided at a portion of said first vacuum exhaust line between said load lock chamber and a connection portion of said first and second vacuum exhaust lines; and

a valve controller for controlling said first and second valves, said valve controller controlling said second valve to be closed during processing of said substrate in said substrate processing chamber.